New Mexico Environment Department Surface Water Quality Bureau
Work Plan for FFY12 and FFY13 CWA 106 Supplemental Monitoring Funds

Introduction

As posted in the Federal Register dated March 29, 2006, New Mexico will be receiving additional CWA 106 funds to be used towards supplemental monitoring activities. This is a **two (2) year work plan covering a total of $340,000** ($170,000 per fiscal year) of FFY12 and FFY13 supplemental monitoring funds available to the State of New Mexico under Section 106 of the Clean Water Act.

New Mexico requests that this work plan be implemented as a project grant with a start date of July 1, 2012 and an end date of December 31, 2015 to ensure that all field and lab work associated with the National Rivers and Streams Assessment (NRSA) is completed. If EPA is unable to award this grant by the start date NMED requests that pre-award cost be approved. These supplemental funds are specifically used to enhance New Mexico's monitoring program and implement portions of New Mexico's monitoring strategy. The Program Elements and outputs associated with this work plan are subject to change over the next year. Any changes to the Program Elements and outputs will be done through a work plan amendment with EPA approval.

Tasks associated with FY 12:

Task A. Biological and Habitat Data Management and Analysis
TOTAL COST: $65,588

To continue the biocriteria development process and maintain a viable bioassessment component to the monitoring program, New Mexico must annually have adequate funds for collecting biological and habitat data and for the processing of biological samples. SWQB needs to complete inventory and identification of benthic macroinvertebrates and periphyton samples from 2012 water quality surveys, fund processing costs for calendar year 2012 samples, and input and manage data in electronic format (within NMEDAS database). These data are critical for the development and refinement of biocriteria and nutrient impairment thresholds for surface waters and defining reference conditions used in bioassessments. This effort falls under Future Initiatives 4-7 and 7-2 through 7-5 of NMED's Monitoring and Assessment Strategy as a means of refining and expanding numeric translators for bottom deposits, plant nutrients, turbidity, and biological integrity narrative standards based on new information. Funds are requested to complete the following components of this task:

1. *Collection of Biological and Habitat Data*

Staff time for collecting and processing fish data collected during the 2012 field season; staff time for other biological and habitat data collections will be covered under the base 106 award. Also included are travel costs associated with biological and habitat surveys (Table 1) and field supplies needed to conduct biological and habitat sampling.

Deliverable: Biological and habitat data collected at ~60 sites
Target Date: December 1, 2012

Table 1. Travel Costs for Biological and Habitat Surveys

Watershed	Per Diem ($85 per person/night)	Approximate Mileage	Fuel Costs ($4 per gallon/17 mpg)
Rio Chama[1]	$3825	4000	$925
Sacramento Mountains[2]	$2210	3250	$755
Lower Rio Grande[3]	$170	700	$155
TOTAL	**$6205**	**7700**	**$1835**

1. 15 overnight trips are planned for the Rio Chama Survey with 3 staff per trip;
2. 13 overnights are planned for the Sacramento Mountain Survey with 2 staff per trip; and
3. 2 overnights are planned for the Lower Rio Grande Survey with 1 staff per trip

2. Analysis of Macroinvertebrate and Periphyton Samples

SWQB will contract with experts to inventory and identify benthic macroinvertebrate, phytoplankton, and diatom samples collected during 2012 water quality surveys (Table 2).

Deliverable: Identification and/or enumeration of macroinvertebrate, phytoplankton, and diatom samples
Target Date: June 30, 2013

Table 2. Contractual Costs for Identification and Enumeration of Biological Samples

	# of samples	Cost per sample	Total Cost
Macroinvertebrates	24	$175	$4,200
Phytoplankton	33	$165	$5,445
Periphyton - Diatoms	7	$290	$2,030
TOTAL	**86 samples**		**$11,675**

3. Chlorophyll Analysis

Staff time for analyzing chlorophyll samples collected during the 2012 field season from (a) all Level 2 nutrient steam sites, and (b) lake and reservoir samples. Staff will also need supplies to conduct chlorophyll sampling and analysis.

Deliverable: Analysis of ~60 chlorophyll samples with data QA'd and uploaded to NMEDAS and ultimately to the EPA national database
Target Date: December 1, 2012 for completion of sample collection
December 31, 2012 for analysis

4. Biological and Habitat Data Management

Staff time for managing biological and habitat data collected during 2012. SWQB MAS staff will upload all data to New Mexico's NMEDAS database for migration to WQX, water quality assessment, as well as in further efforts at biocriteria development.

Deliverable: Data uploaded to NMEDAS database and QA'd
Target Date: April 30, 2013

Task B. Continuous Water Quality Monitoring Devices
TOTAL COST: $15,075

During the last decade the development of water quality monitoring devices connected to data loggers (sondes, thermographs, etc.) has allowed for the continuous monitoring of stream water quality. This is especially true for parameters such as temperature, dissolved oxygen, pH, salinity (EC), and turbidity. New Mexico has been using these devices since 2001 and their importance is only increasing with time, especially as concerns over transient water quality problems due to storm events increases. Many of the instruments that SWQB initially purchased are nearing the end of their useful lifespan. In addition, the demand for new and upgraded instruments is increasing because SWQB is relying on continuous monitoring devices to monitor and assess turbidity; a minimum of 3 days (72 hours) of continuous sonde data is necessary to determine attainment of New Mexico's narrative turbidity criterion.

To complete this task we request funds to update and repair NMED's continuous monitoring devices. This effort falls under Future Initiatives 2-1 and 4-1, and 7-4 of NMED's Monitoring and Assessment Strategy as a means of refining current monitoring methods for more reliable determination of use attainment in New Mexico's surface waters; updating and enhancing sample collection and analysis methods for core water quality indicators; and incorporating a valid, scientifically defensible Turbidity AP based on the current narrative standard.

Deliverable: New data logger instruments for water quality monitoring
Target Date: June 30, 2013

** Leasing, renting, or loaning of government property are not feasible options because this equipment will be used by SWQB for its entire lifespan. Prices listed above are competitive and below the Federal Government list price due to the discount that SWQB is given by the vendor.

Task C. Refinement of SWQB Data Management System
TOTAL COST: $5,000

Under funding received through the FY09 106 supplemental monitoring funds, a "new" WQX compatible database (NMEDAS) for SWQB monitoring data management was developed. However, due to the amount of development necessary and time/financial resources that were available to this project a number of development aspects had to be postponed. While the new data management system is actively in use the database development process is still on-going and the critical need is for further enhancement.

For this task, NMED requests $5,000 in contractual funds to ensure the completion of the following database enhancements:

- Finish the transfer of biological data (e.g. benthic macroinvertebrate data) from "old" database to NMEDAS.

This effort will transfer biological data into usable format which will be used to support the development of assessment protocols, specifically for nutrients (see Task D), under Future Initiatives 7-1 and 7-5 of NMED's Monitoring and Assessment Strategy (revising the nutrient assessment protocol for streams and developing a nutrient assessment protocol for rivers).

Deliverable: Enhancements to NMEDAS database
Target Date: December 31, 2012

** NMED's IT Services Bureau has an existing contract in place with a database developer. SWQB can use this contract so there should be no complications or delays. We anticipate this work being completed by December 31, 2012.

Task D. Identification and Refinement of Nutrient Thresholds for Rivers
TOTAL COST: $44,894

The primary goal of the Clean Water Act is to restore and maintain the physical, chemical, and biological integrity of the nation's surface waters (Clean Water Act Section 101(a)(2)). New Mexico has undertaken an effective approach to address nutrient impairments through application of numeric nutrient translators, or thresholds, to interpret our narrative standard. The intent of nutrient impairment thresholds for nitrogen and phosphorus is to control undesirable aquatic life, such as the excessive growth of attached algae and higher aquatic plants, which can result from the

introduction of these plant nutrients into waterways. This goal is codified into the state's water quality standards [NMAC 20.6.4.13(E)] and serves to protect the existing and attainable uses of surface waters of the state.

The Surface Water Quality Bureau (SWQB) nutrient criteria/assessment efforts have largely focused on wadeable, perennial streams as they represent the majority of assessed surface waters in the state. In recent years, SWQB has made significant progress in identifying nutrient impairment thresholds for non-wadeable rivers of New Mexico. Nevertheless, the special challenges of setting nutrient-related targets and the unique conditions in New Mexico (i.e., limited number of "rivers" and associated data) have led SWQB to a different approach from other criteria derivation methods. Rather than deriving one set of targets to be applied to all rivers, SWQB is developing site-specific targets that vary according to the waterbody and, if appropriate, ecoregion. One of the downsides with this approach is that the present dataset for rivers has significant gaps, particularly for response variables; however over the past couple of years, SWQB has been compiling a more robust dataset that can be used to supplement existing data with the intent to develop nutrient threshold values for rivers.

To complete this task NMED is requesting staff and contractor time for the following tasks:

1. Compile benthic macroinvertebrate data and associated nutrient variables for metrics analysis (SWQB).
2. Compile stream metabolism data for analysis (SWQB).
3. Contract management (SWQB).
4. Change-point and Regression Tree Analyses – identify TN and TP thresholds at which biological data (benthic macroinvertebrates and/or stream metabolism) exhibit a clear change in either magnitude or variability (Contractor).
5. Analyze final report and candidate TN and TP thresholds for application in New Mexico's nutrient assessment protocol for rivers (SWQB).

Various stages of threshold development for rivers including data collection and analysis have been funded through CWA 104(b)(3) and CWA 106 Supplemental funds, but this analysis (i.e., change-point analysis utilizing benthic macroinvertebrate and stream metabolism data) was not included in the scope of previous work plans and is beyond the ability of SWQB to solely undertake. This effort falls within PAM WQ-01a and WQ-26 which track state progress toward adoption of numeric nutrient water quality standards. Furthermore, the identification and refinement of nutrient thresholds falls under Future Initiatives 4-5 and 7-5 of NMED's Monitoring and Assessment Strategy as a means of adding a second biological assemblage for water quality assessments (i.e., benthic macroinvertebrates) and developing a nutrient assessment protocol for rivers.

More robust constraints are obtained when multiple methods are used to define the thresholds. If the analysis is successful, nutrient thresholds for rivers could be used to identify nutrient impaired waterbodies through application of the assessment protocol, develop TMDLs using nutrient thresholds as targets, and implement nutrient control strategies, such as assigning wasteload allocations for NPDES permits.

Deliverable:	Benthic Macroinvertebrate Metric Dataset (Rivers) Contractor report addressing #4 above Nutrient Assessment Protocol for Rivers
Target Date:	December 31, 2012 for dataset June 30, 2013 for contractor report and Nutrient AP for Rivers

Task E. Development of Fish IBI (Index of Biotic Integrity)
TOTAL COST: $30,443

The primary goal of the Clean Water Act is to restore and maintain the physical, chemical, and biological integrity of the nation's surface waters (Clean Water Act Section 101(a)(2)). In 2010, New Mexico adopted a narrative "biological integrity" standard, which states:

> *"Surface waters of the state shall support and maintain a balanced and integrated community of aquatic organisms with species composition, diversity and functional organization comparable to those of natural or minimally impacted water bodies of a similar type and region."*

This narrative standard alludes to the measurable characteristics of biological community structure and function found in natural or minimally impacted water bodies of a distinct region. These measurable characteristics attempt to quantify the biological condition of a particular community (e.g., fish, macroinvertebrates, diatoms) and may be developed and refined into biological criteria.

Currently, SWQB monitors and assesses benthic macroinvertebrate assemblages (insects, worms, clams, etc.) to supplement and enhance chemical monitoring; however benthic macroinvertebrate assemblages are generally reflective of short-term and local impairment. In order to assess environmental conditions on a larger spatial and temporal scale, SWQB would like to supplement benthic macroinvertebrate monitoring with an index of biotic integrity (IBI). An IBI is an index that measures the health of a stream based on multiple attributes of the resident assemblage (e.g., fish, algae, diatoms).

SWQB has been collecting fish community data from select streams, rivers, lakes, and reservoirs since 2000. Last year SWQB used CWA 106 Supplemental Monitoring Funds to explore the feasibility of biological assessment techniques using fish assemblages. A dataset of fish-related data has been compiled, which includes data from other agencies such as the New Mexico Department of Game and Fish and the U.S. Fish and Wildlife Service, among others. An *a priori* classification system based on waterbody type, watershed size, and aquatic life use designation was used to classify the 420 sites with fisheries data; however this *a priori* classification system needs to be evaluated and tested to determine the characteristics critical for a New Mexico Fish IBI.

An IBI could provide an additional water quality monitoring tool to serve as an indicator of impairment in New Mexico's waters. Funds for this task will be used to analyze fisheries data from natural or minimally disturbed sites to develop a Fish IBI for New Mexico. The development of an IBI falls under Future Initiative 4-5 of NMED's Monitoring and Assessment Strategy as a means of adding a second biological assemblage for water quality assessments. Further analysis will be needed to test the classification system and preliminary IBI values before the IBI is incorporated into an assessment protocol.

To complete this task NMED is requesting staff and contractor time for the following tasks:

1. Compile data in a relational database with functions for calculating fish metrics (SWQB).
2. Contract management (SWQB).
3. Transfer and review data, and link to the other NMED datasets (Contractor).
4. Identify reference and stressed sites (Contractor/SWQB).
5. Evaluate quantity and distribution of resulting reference sites for analytical adequacy (Contractor).

Deliverable: Contractor report addressing # 3-5 above
Target Date: June 30, 2013

Task F. SWQB Staff Training on Monitoring, Assessment and TMDLs
TOTAL COST: $9,000

To maintain technical expertise and the ability of New Mexico to continually improve its monitoring, assessment and TMDL programs, we request funding to support staff development. Specifically these funds will be used to cover training or attendance at workshops for SWQB staff in the areas of WQS development and/or revision, monitoring, assessment and TMDLs development. An estimate of the expected travel during the grant period is provided in an attached table. Many of these will be EPA sponsored events directly relevant to the continued development of New Mexico's monitoring strategy. In addition we also seek funds to cover the cost of relevant computer software, reference materials, safety equipment, and other supplies for staff development. This effort falls under Section 10-2 (Training Needs) of NMED's Monitoring and Assessment Strategy as a means to provide training and professional growth opportunities for program staff.

Deliverable: List detailing development expenses and expected benefit
Target Date: On-going, details reported semi-annually

Estimated MAS Travel for Staff Training – July 2012 through June 2013 Associated with Task F.

What	Where	Registration fees	Estimated Airfare	Estimated per diem	Justification/notes
Advancing the Science of Limnology and Oceanography (ASLO) Winter Mtg.	New Orleans, LA	$500	$350	$575	The purpose of this meeting is to disseminate the most current, up-to-date information being collected from a wide range of aquatic sciences
Society for Freshwater Science (SFS) Mtg.	Currently unknown location	$500	$400	$500	SFS promotes further understanding of aquatic ecosystems, with particular interest in benthic biological communities.
American Fisheries Society annual meeting	St. Paul, MN	$500	$350	$570	The AFS was founded to facilitate communication among fisheries biologists.
AZ/NM Chapter of the American Fisheries Society meeting	Someplace in NM	$200	$0	$255	The AZ/NM Chapter of the AFS was founded to facilitate communication among regional fisheries biologists.
North American Lake Management Society (NALMS) International Symposium	Madison, WI	$250	$350	$500	State lake managers discuss successes, evaluate hurdles, and explore new approaches for improving lake programs.
Workshop /Conference in the area(s) of WQS development and/or revision, monitoring, assessment, or TMDL development	Unknown location	$750	$950	$1000	Monitoring and assessment strategies and/or criteria development
TOTAL Travel ESTIMATE →→→		**$2700**	**$2400**	**$3400**	**$8500**

Task G. Evaluation of National Rivers and Streams Assessment Data for New Mexico
TOTAL COST: $0

National survey efforts in 2008 were focused on collecting a statistically representative probabilistic sampling of stream and rivers. A total of 31 sites were sampled in New Mexico. NMED will work with EPA Region 6 to evaluate this dataset to determine (a) if the collected dataset can provide statistically valid conclusions regarding the quality of New Mexico's stream and rivers and (b) how these results compare with the conclusions of New Mexico's 303(d) List of Assessed Waters – specifically how do the results of this probabilistic survey compare with NMED's findings based on a near census of streams and rivers within the state. The results of this analysis will be summarized for inclusion in the State's §303(d)/§305(b) Integrated Report for the 2014-2016 cycle.

Deliverable: Report detailing how the assessment results of the National probabilistic survey compare with NMED's findings based on targeted sampling
Target Date: April 30, 2013

Task H. Participation in National Rivers and Streams Survey
TOTAL COST: In-Kind (*see FY13*)

National survey efforts for the FY12-FY13 funds are focused on Rivers and Streams. NMED requests that EPA Region 6 provide in-kind services and contract with another source for sample collection and laboratory analyses on behalf of the state.

TASKS COVERED UNDER FY13:

Task A. Biological and Habitat Data Management and Analysis
TOTAL COST: $65,186

To continue the biocriteria development process and maintain a viable bioassessment component to the monitoring program, New Mexico must annually have adequate funds for collecting biological and habitat data and for the processing of biological samples. SWQB needs to complete inventory and identification of benthic macroinvertebrates and periphyton samples from 2013 water quality surveys, fund processing costs for calendar year 2013 samples, and input and manage data in electronic format (within NMEDAS database). These data are critical for the development and refinement of biocriteria and nutrient impairment thresholds for surface waters and defining reference conditions used in bioassessments. This effort falls under Future Initiatives 4-7 and 7-2 through 7-5 of NMED's Monitoring and Assessment Strategy as a means of refining and expanding numeric translators for bottom deposits, plant nutrients, turbidity, and biological integrity narrative standards based on new information.

Funds are requested to complete the following components of this task:

1. Collection of Biological and Habitat Data

Staff time for collecting and processing fish data collected during the 2013 field season; staff time for other biological and habitat data collections will be covered under the base 106 award. Also included are travel costs associated with biological and habitat surveys (Table 3) and field supplies needed to conduct biological and habitat sampling.

Deliverable: Biological and habitat data collected at ~50 sites
Target Date: December 1, 2013

Table 3. Travel Costs for Biological and Habitat Surveys

Watershed	Per Diem ($85 per person/night)	Approximate Mileage	Fuel Costs ($4 per gallon/17 mpg)
Jemez River[1]	$3825	1200	$280
Lower Pecos River[2]	$3400	3000	$703
TOTAL	**$7225**	**3700**	**$983**

1. Approximately 15 overnight trips are planned for the Jemez Survey with 3 staff per trip
2. Approximately 10 overnights are planned for tributary sites in the Lower Pecos Survey with 2 staff per trip and 5 overnights are planned for mainstem sites with 4 staff per trip.

2. Analysis of Macroinvertebrate and Periphyton Samples

SWQB will contract with experts to inventory and identify benthic macroinvertebrate, phytoplankton, and diatom samples collected during 2013 water quality surveys (Table 4).

Deliverable: Identification and/or enumeration of macroinvertebrate, phytoplankton, and diatom samples
Target Date: June 30, 2014

Table 4. Contractual Costs for Identification and Enumeration of Biological Samples

	# of samples	Cost per sample	Total Cost
Macroinvertebrates	25	$175	$4,375
Phytoplankton	32	$165	$5,280
Periphyton - Diatoms	5	$290	$1,450
TOTAL	**62 samples**		**$11,105**

3. Chlorophyll Analysis

Staff time for analyzing chlorophyll samples collected during the 2013 field season from (a) all Level 2 nutrient steam sites, and (b) lake and reservoir samples. Staff will also need supplies to conduct chlorophyll sampling and analysis.

Deliverable: Analysis of ~75 chlorophyll samples with data QA'd and uploaded to NMEDAS and ultimately to the EPA national database
Target Date: December 1, 2013 for completion of sample collection
December 31, 2013 for analysis

4. Biological and Habitat Data Management

Staff time for managing biological and habitat data collected during 2013. SWQB MAS staff will upload all data to New Mexico's NMEDAS database for migration to WQX, water quality assessment, as well as in further efforts at biocriteria development.

Deliverable: Data uploaded to NMEDAS database and QA'd
Target Date: April 30, 2014

Task B. Continuous Water Quality Monitoring Devices
TOTAL COST: $15,075

During the last decade the development of water quality monitoring devices connected to data loggers (sondes, thermographs, etc.) has allowed for the continuous monitoring of stream water quality. This is especially true for parameters such as temperature, dissolved oxygen, pH, salinity (EC), and turbidity. New Mexico has been using these devices since 2001 and their importance is only increasing with time, especially as concerns over transient water quality problems due to storm events increases. Many of the instruments that SWQB initially purchased are nearing the end of their useful lifespan. In addition, the demand for new and upgraded instruments is increasing because SWQB is relying on continuous monitoring devices to monitor and assess turbidity; a minimum of 3 days (72 hours) of continuous sonde data is necessary to determine attainment of New Mexico's narrative turbidity criterion.

To complete this task we request funds to update and repair NMED's continuous monitoring devices. This effort falls under Future Initiatives 2-1 and 4-1, and 7-4 of NMED's Monitoring and Assessment Strategy as a means of refining current monitoring methods for more reliable determination of use attainment in New Mexico's surface waters; updating and enhancing sample collection and analysis methods for core water quality indicators; and incorporating a valid, scientifically defensible Turbidity AP based on the current narrative standard.

Deliverable: New data logger instruments for water quality monitoring
Target Date: June 30, 2014

** Leasing, renting, or loaning of government property are not feasible options because this equipment will be used by SWQB for its entire lifespan. Prices listed above are competitive and below the Federal Government list price due to the discount that SWQB is given by the vendor.

Task C. Refinement of SWQB Data Management System
TOTAL COST: $8,000

Under funding received through the FY09 106 supplemental monitoring funds, a "new" WQX compatible database (NMEDAS) for SWQB monitoring data management was developed. However, due to the amount of development necessary and time/financial resources that were available to this project a number of development aspects had to be postponed. While the new data management system is actively in use the database development process is still on-going and the critical need is for further enhancement. For this task, NMED requests $8,000 in contractual funds to ensure the completion of the following database enhancements:

- Develop automated WQX uploads for long-term datasets (sonde and thermograph)

This effort falls under Future Initiatives 5-1 and 6-3 of NMED's Monitoring and Assessment Strategy as a means of building additional automated assessment tools and reports into the in-house water quality database to electronically generate data for basin summaries, survey reports, and TMDL development.

Deliverable: Enhancements to NMEDAS database
Target Date: March 31, 2013

** NMED's IT Services Bureau has an existing contract in place with a database developer. SWQB can use this contract so there should be no complications or delays. We anticipate this work being completed by March 31, 2013.

Task D. Refinement of Nutrient Thresholds for Wadeable, Perennial Streams
TOTAL COST: $33,399

The primary goal of the Clean Water Act is to restore and maintain the physical, chemical, and biological integrity of the nation's surface waters (Clean Water Act Section 101(a)(2)). New Mexico has undertaken an effective approach to address nutrient impairments through application of numeric nutrient translators, or thresholds, to interpret our narrative standard. The intent of nutrient impairment thresholds for nitrogen and phosphorus is to control undesirable aquatic life, such as the excessive growth of attached algae and higher aquatic plants, which can result from the introduction of these plant nutrients into waterways. This goal is codified into the state's water quality standards [NMAC 20.6.4.13(E)] and serves to protect the existing and attainable uses of surface waters of the state.

The Surface Water Quality Bureau (SWQB) nutrient criteria/assessment efforts have largely focused on wadeable, perennial streams as they represent the majority of assessed surface waters in the state. The thresholds and associated assessment protocols for streams were developed using the EPA-recommended percentile approach and have been in use since 2002; however, the current thresholds are not directly linked to use impairment. SWQB recognizes the necessity of linking nutrient concentrations to use impairment and would like to improve and refine the thresholds based on stressor-response relationships while also applying lessons learned in using the protocol.

SWQB anticipates working with EPA and TetraTech (funded through an EPA contract) to explore stressor-response relationships that link nutrient enrichment to use impairment. SWQB is requesting staff time to participate in this process by coordinating with EPA and TetraTech and completing the following tasks that will further NM's progress toward numeric nutrient criteria:

1. Compile stream data for stressor-response (e.g. change point) analysis:
    a. Refine stream classification system using the "new" warm, cool, and cold aquatic life uses and/or sediment site classes (i.e., mountain, foothills, and xeric ecoregions).

b. Compile land use coverages and site scores from probable source sheets to aid in the determination of a human disturbance/biological condition gradient.
c. Compile benthic macroinvertebrate data and associated nutrient variables into an accurate and accessible format to help with metrics calculations.

If funding for a contractor is secured through EPA Region 6 and the data are analyzed for stressor-response relationships, the following items could also be completed by SWQB:

2. Evaluate the impairment thresholds derived by the various methods and found in the literature and define appropriate thresholds for each impairment indicator and stream class.
3. Draft a revised Nutrient Assessment Protocol for Wadeable, Perennial Streams.

Various stages of threshold development for streams including data collection and analysis have been funded through CWA 104(b)(3) and CWA 106 Supplemental funds, but this analysis (i.e., testing and refinement of thresholds through stressor-response analysis) was not included in the scope of previous work plans. This effort falls within PAM WQ-01a and WQ-26 which track state progress toward adoption of numeric nutrient water quality standards. Furthermore, the identification and refinement of nutrient thresholds falls under Future Initiatives 4-5, 4-7, and 7-1 of NMED's Monitoring and Assessment Strategy as a means of adding a second biological assemblage for water quality assessments (i.e., benthic macroinvertebrates), refining and expanding numeric translators for nutrients, and revising the nutrient assessment protocol for streams based on new information.

More robust constraints are obtained when multiple methods are used to define the thresholds. The revised thresholds will be used to identify nutrient impairment through application of the assessment protocol, develop TMDLs using the improved and revised numeric nutrient thresholds as targets, and implement nutrient control strategies, such as assigning wasteload allocations for NPDES permits.

Deliverable: Human Disturbance/Biological Condition Gradient
Benthic Macroinvertebrate Metric Dataset (Streams)
Revised Nutrient Assessment Protocol for Wadeable, Perennial Streams
(*dependent on TetraTech analysis*)
Target Date: June 30, 2014

Task E. Development of Fish IBI (Index of Biotic Integrity)
TOTAL COST: $39,940

The primary goal of the Clean Water Act is to restore and maintain the physical, chemical, and biological integrity of the nation's surface waters (Clean Water Act Section 101(a)(2)). In 2010, New Mexico adopted a narrative "biological integrity" standard, which states:

> *"Surface waters of the state shall support and maintain a balanced and integrated community of aquatic organisms with species composition, diversity and functional organization comparable to those of natural or minimally impacted water bodies of a similar type and region."*

This narrative standard alludes to the measurable characteristics of biological community structure and function found in natural or minimally impacted water bodies of a distinct region. These measurable characteristics attempt to quantify the biological condition of a particular community (e.g., fish, macroinvertebrates, diatoms) and may be developed and refined into biological criteria.

Currently, SWQB monitors and assesses benthic macroinvertebrate assemblages (insects, worms, clams, etc.) to supplement and enhance chemical monitoring; however benthic macroinvertebrate assemblages are generally reflective of short-term and local impairment. In order to assess

environmental conditions on a larger spatial and temporal scale, SWQB would like to supplement benthic macroinvertebrate monitoring with an index of biotic integrity (IBI). An IBI is an index that measures the health of a stream based on multiple attributes of the resident assemblage (e.g., fish, algae, diatoms).

SWQB has been collecting fish community data from select streams, rivers, lakes, and reservoirs since 2000. SWQB has used CWA 106 Supplemental Monitoring Funds to explore the feasibility of biological assessment techniques using fish assemblages. A dataset of fish-related data has been compiled, which includes data from other agencies such as the New Mexico Department of Game and Fish and the U.S. Fish and Wildlife Service, among others. An *a priori* classification system based on waterbody type, watershed size, and aquatic life use designation was used to classify the 420 sites with fisheries data; however this *a priori* classification system needs to be evaluated and tested to determine the characteristics critical for a New Mexico Fish IBI.

An IBI could provide an additional water quality monitoring tool to serve as an indicator of impairment in New Mexico's waters. Funds for this task will be used to analyze fisheries data from natural or minimally disturbed sites to develop a Fish IBI for New Mexico. The development of an IBI falls under Future Initiative 4-5 of NMED's Monitoring and Assessment Strategy as a means of adding a second biological assemblage for water quality assessments. Further analysis will be needed to test the classification system and preliminary IBI values before the IBI is incorporated into an assessment protocol.

To complete this task NMED is requesting staff and contractor time for the following tasks:

1. Contract management (SWQB).
2. Determine appropriate strata or site classes through clustering or PCA (Contractor).
3. Identify candidate fish metrics and calculate metrics for each station (Contractor).
4. Define degradation/impairment metrics (Contractor/SWQB).

Deliverable: Contractor report summarizing preliminary results for # 2-4 above
Target Date: June 30, 2014

Task F. SWQB Staff Training on Monitoring, Assessment and TMDLs
TOTAL COST: $8,400

To maintain technical expertise and the ability of New Mexico to continually improve its monitoring, assessment and TMDL programs, we request funding to support staff development. Specifically these funds will be used to cover training or attendance at workshops for SWQB staff in the areas of WQS development and/or revision, monitoring, assessment and TMDLs development. An estimate of the expected travel during the grant period is provided in an attached table. Many of these will be EPA sponsored events directly relevant to the continued development of New Mexico's monitoring strategy. In addition we also seek funds to cover the cost of relevant computer software, reference materials, safety equipment, and other supplies for staff development. This effort falls under Section 10-2 (Training Needs) of NMED's Monitoring and Assessment Strategy as a means to provide training and professional growth opportunities for program staff.

Deliverable: List detailing development expenses and expected benefit
Target Date: On-going, details reported semi-annually

Estimated MAS Travel for Staff Training – July 2013 through June 2014 Associated with Task E.					
What	**Where**	**Registration fees**	**Estimated Airfare**	**Estimated per diem**	**Justification/notes**
Advancing the Science of Limnology and Oceanography (ASLO) Winter Mtg.	?	$300	$350	$575	The purpose of this meeting is to disseminate the most current, up-to-date information being collected from a wide range of aquatic sciences
Society for Freshwater Science (SFS) Mtg.	?	$300	$400	$500	SFS promotes further understanding of aquatic ecosystems, with particular interest in benthic biological communities.
American Fisheries Society annual meeting	?	$300	$350	$570	The AFS was founded to facilitate communication among fisheries biologists.
AZ/NM Chapter of the American Fisheries Society meeting	Someplace in AZ	$200	$200	$255	The AZ/NM Chapter of the AFS was founded to facilitate communication among regional fisheries biologists.
North American Lake Management Society (NALMS) International Symposium	?	$250	$350	$500	State lake managers discuss successes, evaluate hurdles, and explore new approaches for improving lake programs.
Workshop /Conference in the area(s) of WQS development and/or revision, monitoring, assessment, or TMDL development	Unknown location	$750	$950	$1000	Monitoring and assessment strategies and/or criteria development
TOTAL Travel ESTIMATE →→→		**$2100**	**$2400**	**$3400**	**$7900**

Task G. Participation in National Rivers and Streams Survey
TOTAL COST: In-Kind ($216,000)

National survey efforts for the FY12-FY13 funds are focused on Rivers and Streams. NMED requests that EPA Region 6 provide in-kind services and contract with another source for sample collection and laboratory analyses on behalf of the state.